Chesterfield County
Annual Stormwater Management And Monitoring Report 2013

Detailed watershed investigation–Unnamed Tributary to James River, May 2013

Chesterfield County
Department of Environmental Engineering
Water Quality Section
April 2014

Stormwater Management Program - Table of Contents

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List of Acronyms:

BI = Chesterfield County Department of Building Inspections
BMP = Best Management Practice
BOS = Chesterfield County Board of Supervisors
CBPA = Chesapeake Bay Preservation Act
CCPSS = Chesterfield County Public School System
CompPlan = "Moving Forward - The Comprehensive Plan for Chesterfield County"
County = Chesterfield County
CU = Chesterfield University
Drainage = Chesterfield County Department of Environmental Engineering – Drainage Section
DOGS = Chesterfield County Department of General Services
ED = Chesterfield County Department of General Services – Environmental Division
EE = Chesterfield County Department of Environmental Engineering
EPA = U.S. Environmental Protection Agency
EPT = Ephemeroptera, Plecoptera and Trichoptera
ESC = Erosion and Sediment Control

Extension =	Virginia Cooperative Extension Service
Fleet =	Chesterfield County Department of General Services – Fleet Management Division
FEMS =	Chesterfield County Fire and EMS
GIS =	Geographic Information System
Health =	Virginia Department of Health, Chesterfield Health District
HSI =	Hotspot Site Investigation
IDDE =	Illicit Discharge Detection and Elimination
IDO =	Chesterfield County Illicit Discharge Ordinance
LDP =	Land Disturbance Permits
LID =	Low Impact Development
MS4 =	Municipal Separate Storm Sewer System
NOV =	Notice of Violation
Parks =	Chesterfield County Department of Parks and Recreation
Planning =	Chesterfield County Planning Department
Pretreatment =	Chesterfield County Utilities Department – Pretreatment Section
RPA =	Resource Protection Area
RPAD =	Resource Protection Area Designation
SAP =	Sampling and Analysis Plan
SPCC =	Spill Prevention Control and Countermeasure
SWM =	Stormwater Management structure
SWPPP =	Stormwater Pollution Prevention Plan
TMDL =	Total Maximum Daily Load
Utilities =	Chesterfield County Utilities Department
VA DCR =	Virginia Department of Conservation and Recreation
VA DEM =	Virginia Department of Emergency Management
VA DEQ =	Virginia Department of Environmental Quality
VA DOF =	Virginia Department of Forestry
VDACS =	Virginia Department of Agriculture and Consumer Services
VDOT =	Virginia Department of Transportation
VPDES=	Virginia Pollutant Discharge Elimination System
VSCI =	Virginia Stream Condition Index
VSMP =	Virginia Stormwater Management Program
WASP =	Watershed Assessment and Stream Protection Program
Wastewater =	Chesterfield County Utilities Department – Wastewater Collections Division
WQ=	Chesterfield County Department of Environmental Engineering – Water Quality Section
WQP =	Chesterfield County Water Quality Protection Plan

Executive Summary

The following document presents the data and information generated for the County's VPDES permit report during the calendar year 2013.

Structural Controls - Best Management Practices

In 2013, the County certified a total of 34 BMP and SWM structures, 24 of those structures had associated phosphorus removal rates as detailed. Collectively, these structures have been designed to remove a total of 82.34 pounds of phosphorus (P) annually from 146.97 acres. A total of 229existing BMPs and SWMs received routine maintenance by Drainage staff in 2013. Commercial and institutional property owners maintained another 105 private structures.Additionally, Drainage staff performed 320 visual inspections of BMPs and SWMs during rain events in 2013 to monitor performance and function of the structures. During 2013, Drainage staff performed maintenance activities on 185.26 miles of storm sewer infrastructure.

Source Controls - Public Information and Engagement Program

The public information and engagement program plays an important role in protecting water quality in the County. The program is divided into three categories: general outreach, education and volunteer activities. In 2013, WQ staffreceived more than 900 calls and emails from residents. The WQ staff's general outreach activities and participation included but were not limited to rain garden workshops, rain barrel workshops, the Stop the Drop Campaign/ P.U.P Club, the Plant More Plants Campaign/Chesapeake Club and the Riparian Stewardship Program. The educational programs organized and participated in by Water Quality staff included but were not limited to educator training, Virginia Commonwealth University Teacher Institute, Greater Richmond Environmental Education Network, stormwater education workshops, student engagement programs and County staff training. Lastly,a comprehensive set of water quality focused volunteer programs are in effect in the County. These programs include but are not limited to:Chesterfield WaterTrends – Resident Volunteer Water Quality Monitoring, volunteer storm drain marking, volunteer cleanup efforts and volunteer buffer plantings.

General Services - Environmental Division Education and Outreach Programs

ED implementedand/or participated in three pollution prevention education and outreach programs in 2013targeted toward the reduction of trash, debris and litter. These programs relate and contribute to the County's stormwater program by reducing the amount of floatable materials and debris conveyed to the stormwater system by rain or littering events. The three programs were a "Fool for Art/Environmental Fair" in April where staff addressed the general public on various pollution prevention strategies, a Falling Creek watershed cleanup event held in April and a Tire Amnesty Day event held in May.

Source Controls – County Pollution Prevention Projects

The County initiates and completes various short and long-term pollution prevention projects on County property that reduce impacts on the environment. Threeprojects were continued in

2013that either directly or indirectly related to the County's stormwater system. These projects were sustained at a total cost of $27,500.

Plans and Regulatory Updates and Program Improvements

The County provides for the protection, improvement and preservation of the water quality of water bodies within and downstream of its boundaries through the County's comprehensive planning efforts and state and federal laws which are implemented through local ordinances, polices, education and other tools.

The Comprehensive Plan (2012) provides a vision for the future, enabling County officials and residents to anticipate and deal constructively with changes occurring within their community. During 2013, the County initiated steps necessary to carry out the goals and guidelines outlined in the Implementation Chapter of the plan. Staff amended County ordinance in preparation for 2014 adoption of the Virginia Stormwater Management Program Regulations (9VAC25-870).

During 2013, no regulatory amendments or adoptions were publicly considered with respect to environmental regulations. However, several process improvements, such as erosion and sediment inspections performance and CBPA review requests for encroachment, were made to programs used in the implementation of existing regulations.

During 2013, 30 proposals for encroachment within the RPA were requested of the County, 65 RPADs were conducted yielding approximately six miles of new perennial streams and fourteen alleged RPA violation investigations were conducted. During 2013, a total of 146 plans were approved for construction.

Storm Sewer System Maintenance and Improvements

During 2013, Drainage staff performed maintenance activities on 185.26 miles of storm sewer infrastructure. EE initiated a major drainage improvement project in 2013 to alleviate flooding and standing water inHuntingcreek Hills Subdivision. The drainage project is approximately 65 percent complete, and involves constructing a storm sewer system approximately 1,800 feet in total length at a cost of $318,000.

Illicit Discharge, Storm Sewer and Water Quality Investigations

WQstaff conducted298 water quality investigations, including 215 illicit discharge investigations resulting in 100 NOVs. The illicit discharge investigations were divided into seven categories: mopwater/washwater,vegetation/sediment, organics, chemical, construction wastes, hydrocarbons, and miscellaneous. The two most common violations (mopwater/washwater, vegetation/sediment) accounted for 128 of the 215 illicit discharge investigations.

WQ staff conducted screenings of 498 outfalls and seventeen upstream structures. Of the 515 structures, 115 had dry weather flows that were analyzed in the WQ laboratory.Three structures were classified as having potential or obvious illicit discharges and follow-up visits at each of these outfalls have been conducted.Additionally, seven follow-up visits for outfalls screened

in2012 have been completed. Thirty-two (32) additional outfall screenings were performed at the County airport complex by a private consultant and indicated no incidents of noncompliance or non-stormwater discharges.

In 2013, Health investigated 87 septic complaints and issued 260 onsite sewage repair permits in the County.As a result of the complaint responses, investigations and onsite inspections, Health issued a total of 40 Notices of Alleged Violation during 2013. Additionally, Health received documentation relating to 5,149 septic tank pump outs and 266 Alternative Onsite Sewage System inspections conducted in the County during 2013.

Wastewater maintained approximately 1,984 miles of sanitary sewer lines and responded to 20 reportable public sanitary sewer incidences during calendar year 2013. In all of the incidents, Utilities corrected the problems and continues to employ strategies to prevent future issues.

FEMS office reported fourteen (14) occurrences in 2013 where FEMS personnel were dispatched to address incidences involving either the direct release of product to the County stormwater system or where there was a high probability a release would occur if not immediately remediated.In the majority of the instances, HAZMAT staff secured the site and contained the product to insure no further discharges occurred.HAZMAT personnel or commercial remediation contractors performed subsequent cleanup operations.

Detailed Watershed Assessments

Two detailed watershed investigations were conducted in 2013, the first occurring in an Unnamed Tributary to the James River, the second in Grindall Creek. The investigation of the Unnamed Tributary to the James River consisted of a thorough visual assessment of the stream and its surrounding watershed. Riparian buffer perturbations, channel incision, and nutrient inputs were observed during the investigation. The assessment of Grindall Creek consisted of methods used in illicit discharge detection and elimination, and revealed that limited riparian buffer, intensive commercial, industrial and residential development, coupled with housekeeping issues identified at a few local businesses may be contributing to the stream's current condition.One illicit connection was identified and corrected as part of this investigation.

Watershed level assessments were conducted within three drainage basins in 2013; four stream sites draining directly to the Appomattox River, six stream segments draining directly to the James River and at five reaches within the Michaux Creek watershed. Physical, chemical, biological, and habitat data were collected and analyzed with the results integrated into a water quality index score. The majority of these assessments indicated good (n=8) water quality conditions.

Management and Disposal of Used Oil and Toxic Materials

During 2013, approximately 56,889 pounds of used motor oil from Fleet were recycled or used as fuel at five County clean burn furnaces.Additionally, 864 pounds of used antifreeze and 10,314 pounds of oil solids (crushed filters and absorbents) were collected and recycled.At Fleet

facilities, no reportable oil spills as defined by the EPA in the Clean Water Act and Oil Pollution Act occurred during 2013.

Facility Inspections

Eleven commercial and industrial facilities were inspected for stormwater compliance purposes. WQ staffconducted windshield survey inspectionsof commercial and industrial facilities and found many of the incidents described above in "Illicit Discharge, Storm Sewer and Water Quality Investigations" or below in "Releases from Commercial/Industrial Facilities" as a result.No changes were made to the *Industrial and Commercial Facility Inspection Standard Operating Procedure Manual* in 2013.

Releases from Industrial/Commercial Facilities

Eight potential releases from industrial facilities were investigated.Potential releases included waste management issues, a chemical spill, leaking plumbing and improper washwater disposal.Three releases were confirmed and corrective actions and/or cleanups were performed. Potential for release was confirmed at four sites, corrective actions were recommended or required and compliance was achieved. One potential release was determined to be an electrical cable instead of a hose.

Erosion and Sediment Control

In 2013, EE issued 121 LDP for 612.62 acres and 25,820 ESC inspections were conducted. There were 18,501 ESC inspections conducted for single-family dwellings, 11,777 inspections for development sites and subdivisions and 16 inspections resulting from residents' complaints. One hundred seventy (170) of the site and subdivision inspections resulted in the issuance of Notices to Comply. There were four NOVs issued during the 2013 calendar year. The EE ESC program continues to be compliant with the Virginia Water Control Board in 2013.

§122.26 (d) (2) (iv) (A)
"A DESCRIPTION OF STRUCTURAL AND SOURCE CONTROL MEASURES TO REDUCE POLLUTANTS FROM RUNOFF FROM COMMERCIAL AND RESIDENTIAL AREAS THAT ARE DISCHARGED FROM THE MUNICIPAL STORM SEWER SYSTEM"

(1) "A description of maintenance activities and a maintenance schedule for structural controls to reduce pollutants in discharges from municipal separate storm sewers."

Development can significantly alter landscapes by increasing imperviousness and changing drainage patterns, thereby increasing the volume and velocity of stormwater runoff from the site. Two groups of BMPs can be used to minimize the impacts of stormwater from developed areas: nonstructural site design or source control measures which prevent or reduce the generation of pollutants and structural BMPs that detain and treat stormwater to control for runoff volume and to reduce pollutant loading to receiving waters. The County has required structural stormwater controls since 1991 to meet post-construction site runoff requirements. Structural stormwater facilities are classified as either SWMs, providing downstream flood control, or BMPs for quality and/or quantity controls.

Structural Controls

The construction and proper installation of BMPs and SWMs are verified in the field by a licensed engineer or surveyor and are subsequently certified by the County. Once a BMP or SWM is certified, it is entered into EE's database for tracking, inspection and maintenance. To date there are 579 certified structures present in the County.

Table 1. BMP/SWM facilities with phosphorus removal efficiencies certified in Chesterfield County, 2013. The "n" designation following three of the project names reflect the number of individual BMPs of that specific type certified onsite during 2013.

Project Name	Address	Type	HUC	Watershed	Receiving Waterbody	Acres Treated	P Removed (lbs/yr)
Ample Storage Expansion	11150 Ironbridge Boulevard	Retention	JL03	Proctos Creek	Great Branch	27.14	3.51
Bellwood Properties Laydown Yard	1510 Bellwood Road	Retention	JL03	Kingsland Creek	Kingsland Creek	4.39	1.84
Dollar General Screamersville	14501 Spruce Avenue	Biofiltration	JA45	Johnson Creek	Johnson Creek	2.35	1.31
JB Watkins Elementary School Addition	501 Coalfield Road	Wet Marshy Bottom	JL02	Falling Creek	Falling Creek	5.39	3.21
JB Watkins Elementary School Addition (n=2)	501 Coalfield Road	Filterra	JL02	Upper Swift Creek	Little Tomahawk Creek	1.01	1.08
Magnolia Green Section J	7300 Vicenzo Dr.	Bio-Retention	JA41	Upper Swift Creek	Blackman Creek	1.13	0.627
Mount Blanco on the James Section 1 (n=2)	12200 Rotunda Ln	Retention	JL05	James River	James River	81.9	25.02
Northern Area Convenience Center Improvements	3204 Warbro Road	Biofiltration	JA42	Lower Swift Creek	Nutbrse Branch	3.06	1.57
Old Dominion Tire Direct Vehicle Parking Area	3111 Warbro Road	Retention	JA42	Lower Swift Creek	Nutbrse Branch	5.82	5.31
Saint Francis AOC	13851 St Francis Boulevard	Bio-Retention	JA41	Upper Swift Creek	Little Tomahawk Creek	0.39	0.63
Saint Francis AOC (n=7)	13851 St Francis Boulevard	Filterra	JA41	Upper Swift Creek	Little Tomahawk Creek	3.71	4.82
The Woodlands Volume I	1212 Koger Center Boulevard	Wet Marshy Bottom	JL02	Falling Creek	Falling Creek	32	24.97
Verizon Wireless Goodes Bridge	2501 Goodes Bridge Road	Filterra	JL02	Falling Creek	Poocohock Creek	0.34	0.32
Waffle House Chester Road	4301 Old Lane	Detention	JL03	Proctors Creek	Great Branch	0.9	0.35
YMCA 360 West	16800 Hampton Park Drive	Wet Marshy Bottom	JA41	Upper Swift Creek	Dry Creek	7.85	3.57

In 2013, the County certified a total of 34 BMP and SWM structures, 24 of those structures had associated phosphorus removal rates as detailed in Table 1. Collectively, the 24structures have been designed to remove a total of 82.34 pounds of phosphorus (P) annually from 146.97 acres.

Recorded County drainage easements require that BMPs and SWMs be properly inspected and maintained. In the County, two maintenance schedules are in effect. Commercial structures located outside of the Swift Creek Reservoir watershed or land area above the reservoir dam, are inspected the first year after certification and every three years thereafter. The inspection and maintenance is the responsibility of the owner of the facility. Schedules are tracked through a database that determines when necessary maintenance must take place. The database generates letters notifying facility owners of the need to perform an inspection.

Both the inspection and maintenance requirements for all subdivision structures throughout the County and those commercial property facilities in the Swift Creek Reservoir watershed are the responsibility of the County. The inspection and maintenance are normally performed on a yearly schedule by County staff.

A total of 229existing BMPs and SWMs received routine maintenance by Drainage staff in 2013.Commercial and institutional property owners maintained another 105 private structures. Additionally, Drainage staff performed 320 visual inspections of BMPs and SWMs during rain events in 2013 to monitor performance and function of the structures (risers draining, inflow and outflow conveyances clear, *etc.*).

Source Controls - Public Information and Engagement Program

The public information and engagement program plays an important role in protecting water quality in the County. The program is divided into three categories: general outreach, educationand volunteer activities. General outreach occurs on a daily basis as staff interacts with the public. Staff members use the water quality publications and website to aid in public interactions. In 2013, the WQ staff received more than900 calls and emails from residents. Other general outreach occurs by participating in events such as community fairs, regional social marketing campaigns and a variety of program offerings. The education program includes student engagement, educator training and County personnel training. Finally, volunteer programs exist for residents who show an interest in the environment or want to engage in water quality oriented programs.

General Outreach Programs

The general outreach programs are designed for all County residents. They are designed to raise awareness of water quality issues and prepare residents to be stewards of County waterways and the Chesapeake Bay.

Rain Garden Workshops

In 2013,EEcollaborated with Pocahontas State Park and Chesterfield County Schools to host rain garden workshopsfor residents. The rain garden workshop series equips residents with skills and resources to create residential scale rain gardens at home. Two workshops were held in the fall of 2013.At the workshops, participants learned about rain garden design and built a public rain garden at each location. Public rain gardens with interpretive signs were installed at Pocahontas State Park and Bon Air Elementary School. One hundred fifty-oneparticipants attended these programs.

Rain Barrel Workshops
Staff and community partners collaborate to offer rain barrel workshops for residents. Partners included Extension, James River Soil and Water Conservation District and Chesterfield County Public Libraries. Chesterfield Master Gardeners were trained as volunteers for the workshops and assisted program staff with implementation. Workshops were held in May and June of 2013. A total of six workshops were held and one hundredforty-nine (149) rain barrels were constructed and put into use at County homes and surrounding areas.

Stop the Drop Campaign / P.U.P Club
WQ staff served as the chairperson of the regional committee spearheading the Stop the Drop Campaign/P.U.P. Club. The program strives to educate the public about the importance of disposing of pet waste to reduce bacterial pollution in runoff and is a collaborative effort of the County, Henrico County, City of Richmond and other local environmental groups and non-profit organizations. The campaign stemmed from the James River Bacteria TMDL adopted in 2010 and was one of the recommendations made by the regional TMDL Implementation workgroup. In 2013, the Richmond Regional Pet Waste Outreach Committee printed 2000 posters and 2000 stickers that displayed the "Stop the Drop" logo. The posters are currently displayed at pet-related businesses in the County, Henrico and City of Richmond. The campaign also has an active social media presence on Facebook.

Plant More Plants Campaign / Chesapeake Club
The "Plant More Plants / Chesapeake Club" media campaign brought to the Richmond Metropolitan Region by the VA DCR in 2007 was continued in 2013. The outreach material for this campaign presents a message about proper lawn care and fertilizer use and is designed to affect behavior change by appealing to consumers' love of seafood and the Chesapeake Bay lifestyle.

The "Plant More Plants" campaign encourages homeowners to plant native species of trees and shrubs in their yards to filter and absorb runoff. The 2013 campaign included television and internet advertising and in-store promotions with retail partners. The campaign ran in Richmond, Norfolk and Washington D.C.

LID (Low Impact Design) Program
EE and developers to use LID for the reduction of pollutants, volume and velocities of stormwater to adjacent streams and rivers. LID practices preserve and recreate the natural landscape and hydrologic conditions of a site by minimizing impervious surfaces and allowing for infiltration. Examples of LID practices include rain gardens, rain barrels, permeable pavers and bioretention areas. The EE website has a comprehensive list of LID resources for engineers and builders. The development community is encouraged to use these resources.

The Middle James Roundtable
The Middle James Roundtable is a consortium of stakeholders that brings people together to improve the health and water quality of the James River watershed. Participants include residents, businesses, civic organizations and government. WQ staff served on the Steering Committee in 2013.

In May 2013, the roundtable held its annual meeting at Virginia Commonwealth University. WQ staff presented a session on the rain garden workshop series. Seventy-six people attended the event.

The Roundtable was awarded a 2010 Chesapeake Bay Restoration Fund grant to support the design and printing of restaurant coasters and place mats about water quality stewardship. Roundtable partners including Chesterfield County have the ability to customize the material with their own messages and logos. The Environmental Outreach Coordinator served as chairperson of the roundtable education committee leading the project.The project resulted in the production of 50,000 restaurant coasters and 62,500 educational placemats. To date, approximately 30,000 coasters and 55,000 placemats have been distributed to Roundtable partners statewide including schools and community groups in Chesterfield County.

Chesterfield County Riparian Stewardship Program
In 2008, EE was awarded a Chesapeake Bay Small Watershed Grant to establish a Riparian Stewardship Program. This program aims to motivate riparian landowners to maintain healthy buffer areas adjacent to water bodies on their property. Components of this grant included developing targeted social marketing outreach materials for riparian landowners and holding riparian landowner workshops.In 2013, 32 riparian landowners received 600 native trees for planting on their property.

The Chesterfield County Water Quality Section Website
WQ's website located at http://www.chesterfield.gov/EnvironmentalEngineering/and serves as a valuable tool for general education & outreach. All County publications mentioned in this report are available online, as well as, general water quality information, technical reports and staff contacts.

Education Programs

EE has created programs targeted at students and educators in the CCPSS. The programs are focused on educator training and student engagement. Additionally,the WQ staff is responsible for training County personnel in stormwater management techniques and pollution prevention. WQ staff also offers programs and training to local universities, businesses, civic organizations and volunteer organizations. These programs are designed to raise awareness of water quality issues.

Educator Training
WQ staff works with the CCPSSScience Lead Instructors in developing curriculum, Grants Administrator to securing funding and individually with teachers. The Enviroscape, a non-point source runoff training aid, and water quality monitoring kits are made available to teachers.

Virginia Commonwealth University (VCU) Teacher Institute
In June 2013,WQ staff presented at the VCU Summer Teacher Institute at the VCU Rice Center in Charles City County.The session covered water conservation, stormwater pollution prevention

and rain barrels. Fifteen teachers from school districts across Virginia attended the program and created fifteen rain barrels for use at school.

Virginia Environmental Education Conference
In August 2013,WQ staff presented a workshop for educators at the Virginia Environmental Education Conference in Orkney Springs, Virginia. The session covered water conservation,pollution prevention, rain barrel construction and workshop planning and connected the subject to the Virginia Standards of Learning for science and mathematics. Eleven participants attended the session.

Greater Richmond Environmental Education Network
WQ staff participated in the Greater Richmond Environmental Education Network; a collaboration of Richmond area environmental educators that facilitates communication and resource sharing. In October 2013, WQ staff presented about rain garden construction and workshop planning to eight people.

Stormwater Education Workshop
In January 2013, the Central Virginia Waste Management Authority conducted a workshop on stormwater and pollution prevention education. WQ staff led a session on the Stop the Drop Campaign/P.U.P. Club program for the 46 attendees.

Student Engagement Programs

Bon Air Elementary School Rain Garden
In November 2013,EE collaborated with Bon Air Elementary School to create a rain garden on school grounds. Students at the school raised money to pay for materials and the staff performed the excavation and installed biofilter media. WQ staff taught140 students about the functions of rain gardens and assisted during planting.

Patrick Henry School of Science and Arts
In September 2013, WQ stafftaught 115 students from Patrick Henry School of Science and Arts about riparian buffers and the importance of managing invasive species. The program was part of a field trip to Forest Hill Park. The students removed invasive species from riparian areas of the park and replanted with native plants.

Envirothon
WQ staff served as the aquatics coach for the Chesterfield Area Envirothon, an annual environmental science competition for high school students. In March of 2013, eighteen students from three area high schools participated in the event.

County Staff Training

Chesterfield University (CU) Training
CU offers courses to all County employees on a diverse range of topics. WQ staff developed and delivers a course, through CU, regarding stormwater pollution prevention at work and at home. In 2012, CU introduced a new School of Health, Environment, Safety and Security and the

Stormwater Pollution Prevention class became a required class for the school certificate. The class is two hours long and includes a controlled pollution spill demonstration.WQ staff taught the class in June 2013 to four employees.CU also offers a SPCC class taught in April and October. In 2013, Sixty-three County employees attended the class.

Departmental Trainings
Parks conducts a spill response training program for its employees to maintain its Environmental & Sustainability Management System (ISO 14001) certification. In 2013, 79 employeescompleted the training.Multiple County departments conduct department-specific trainings on spill response and spill kit use. In 2013, 200 County employees attended department-specific trainings.

Volunteer Activities

A comprehensive set of water quality focused volunteer programs are in effect in the County. The following are the objectives of the water quality volunteer programs:

- Enhance public education activities and promote environmental stewardship
- Involve a cross-section of residents
- Complement the monitoring requirements of the County's VPDES permit
- Provide a team of resident monitors who can identify water quality improvements or degradation in their community.

Chesterfield WaterTrends – Resident Volunteer Water Quality Monitoring
Chesterfield WaterTrends is the County's official resident monitoring program. WaterTrends monitors collect data on a volunteer basis to indicate a general state of water quality throughout the County.Regular measurements of water quality were made by volunteers at thirty stream and river stations and two lake stations in the County in 2013. There were 331 individual site visits conducted by 32 volunteer monitors, representing a total of 468.35 hours of effort. Results were submitted and integrated into the VADEQ non-agency database and are presented in detail within Section 2.3of this report entitled *"2013 Chesterfield WaterTrends Report of the Quality of Select Streams, Rivers and Lakes in Chesterfield County, Virginia"*.

Volunteer Storm Drain Marking
WQ began the Storm Drain Marking Program in 2000 with a Chesapeake Bay Small Watershed Grant administered by the National Fish and Wildlife Foundation. Two thousand placards and supplies were purchased with this grant money for a pilot project. The placards include the name of the river, stream or reservoir that the area drains to as well as the anti-pollution message of "No Dumping!" and the County's illicit discharge hotline number. In 2001, the County received a second grant to purchase an additional 10,500 placards and expand the program countywide. In 2013, the Woodlake Community Association applied storm drain markers in four neighborhoods. Additionally, County staff made a focused effort to mark the storm drains at County-owned facilities. Emphasis was placed on the County government complex and satellite facilities operated by Fleet(Table 2).

Table 2.Storm drain marking program statistics 2013.

Location	Watershed	Curb Markers Installed
Chesterfield County Government Complex	Kingsland Creek	76
Fleet School Bus Garages	Kingsland and Falling Creeks	3
Woodlake Community	Swift Creek Reservoir	20
Total		99

Volunteer Cleanup Efforts

WQ staff actively participated in the James River Regional Cleanup, hosted by the James River Advisory Council. This event takes place the second weekend of September and attracts hundreds of participantsfrom the County. Multiple County departments including the Extension and Parks participated in the event. The County offered two sites for volunteers in 2013: Dutch Gap Boat Landing and the Falling Creek Ironworks Park. During the cleanup,172 volunteers collected 79 bags of trash and 91 bags of recyclables at the two sites.

In June 2013,the County collaborated with the Chesapeake Bay Foundation on its annual Clean the Bay Day.Sixteen volunteers participated in a cleanup of Pocoshock Creek cleaning near its intersection with Midlothian Turnpike and the end of Sturbridge Drive. Twenty bags of trash and numerous bulk items such as tires and grocery carts were collected.

Volunteer Buffer Planting

In March 2013, EE partnered with local Cub Scouts, VCU and the VA DOF to restore the riparian buffer on Proctors Creek at 10600 Jefferson Davis Highway. Thirty-nine volunteers worked 117 hours and planted 225 trees to restore a half-acre of buffer.

Department of General Services Education and Outreach Programs

ED implemented and/or participated in three pollution prevention education and outreach programs in 2013 targeted toward the reduction of trash, debris and litter. These programs relate to the County's stormwater program by reducing the amount of floatable materials and debris conveyed to the stormwater system by rain or littering events. The three programs were the "Fool for Art/Environmental Fair" held on April 12, 2013, Falling Creek watershed cleanup event on April 27, 2013and Tire Amnesty Day on May 4, 2013. All of these events focused on keeping Chesterfield County clean and green with a strong emphasis of keeping the roadways litter free.

On April 13, 2013, thirteen employees from the Fleet participated in the annual "Fool for Art" Earth Day Event at John Tyler Community College. At this event, Fleet staff spoke to the general public about a variety of pollution prevention and energy saving programs such as fuel saving tips, scraps metal recycling, clean burn furnaces and car washing.

On April 23, 2013, Fleet provided SPCC Plan training to 28 Fleet employees. Additionally, 4 Fleet employees received stormwater pollution prevention training from WQ staff in 2013.

Chesterfield's Anti-Litter Program provided supplies and educational material to Falling Creek Middle School students for the April 27, 2013, Falling Creek watershed cleanup event. Twenty-six students removed over 400 pounds of trash.

During the Tire Amnesty event, up to five tires were accepted at the Southern Area Convenience Center free of charge with the hope of reducing illegal tire dumping.

Outreach Materials

WQ continues to use the Water Quality Watch Fact Sheet series created in 1997 as a general outreach and education vehicle to residents and businesses. These publications are republished and updated as needed and when funds become available. Other publications have been created and distributed, as the need exists, such as the *Don't Feed the Lake* brochure and the *Rain Garden Installation and Design* booklet. Table 3 on the following page lists the County's current outreach materials.

Table 3.Chesterfield County Outreach Materials 2013.

Material	***Type***	***Lead Group***	***Target Group***
Chesterfield County Water Quality Section website: http://www.chesterfield.gov/content2.aspx?id=2851	*Website*	*Water Quality*	*General public*
Rain Garden Installation and Design	*Booklet*	*Water Quality*	*General public*
Chesterfield County Resource Protection Area Restoration Guide	*Booklet*	*Water Quality*	*General public*
Chesterfield County Resource Protection Area Restoration Guide *Chesterfield County Stormwater Management Program* *Chesapeake Bay Resource Protection Areas* *The Streams of Chesterfield County* *Homeowners Guide to Flood Plain Management* *Business & Industry Guide to Chesterfield County's Illicit Discharge Ordinance* *Household Guide to Chesterfield County's Illicit Discharge Ordinance* *Chesterfield County's Stormwater Drainage System*	*Fact Sheet*	*Water Quality*	*General public*
What is this Orange Slime in my Creek? *What is this Foam in my Creek?* *What are those Tubes in the Field?*	*Fast Enviro Facts Sheet*	*Water Quality*	*General public*
Don't Feed the Lake	*Brochure*	*Water Quality*	*Residents who live near lakes*
Storm Drain Markers	*Plastic marker adhered to storm drains*	*Water Quality*	*General public*
Chesterfield Extension Website: http://www.chesterfield.gov/HumanServices/ExtensionServices/exthome.asp	*Website*	*Chesterfield Extension*	*General Public*
Six Steps to Cleaner Water (lawn & home)	*Brochure*	*Chesterfield Extension*	*General Public*
Home Landscape Practices to Protect Water Quality	*Brochure*	*Chesterfield Extension*	*General Public*
Chesterfield County – Did you Know? (Fact sheet on lawn care)	*Fact Sheet*	*Chesterfield Extension*	*General Public*
Lawn Care Clinics (5 clinics in addition to being online)	*Power Point Presentation*	*Chesterfield Extension*	*Interested Public*
Five Ways to Help the James	*Brochure & Ads in newspapers*	*Middle James Roundtable*	*General Public*
James River Watershed Educational Placemats/Activity Sheets	*Placemat/Activity Sheet*	*Middle James Roundtable*	*General Public*

Source Controls – County Pollution Prevention Projects

The County initiates and completes various short and long-term pollution prevention projects on County property that reduce impacts on the environment. Three projects were continued in 2013 that either directly or indirectly related to the County's stormwater system (Table 4). These projects have an estimated cost of $27,500.The projects were initiated, administered and completed voluntarily by the County to prevent unwanted discharges to the environment.

Table 4. County pollution prevention projects related to MS4 ongoing or completed in 2013.

Pollution Prevention Project	County Department	Date Completed	Estimated Cost	Resulting Improvement
RogersBuilding cooling tower water run off	Buildings and Grounds	Ongoing	$17,500	Reduction of cooling tower runoff to ground water & adjacent stream
Maintenance of chemical runoff from cooling towers	Buildings and Grounds	Ongoing	$10,000	Eliminate the probability for environmental contamination.
Used Tire Recycling	General Services - Fleet Management	Ongoing	No Cost Incurred	Avoidance of stormwater runoff by keeping collected used tires inside the shop prior to recycling.

(2) "A description of planning procedures including a comprehensive master plan to develop, implement and enforce controls to reduce the discharge of pollutants from the municipal separate storm sewer which receives discharges from areas of new development and significant redevelopment. Such plan shall address controls to reduce pollutants in discharges from municipal separate storm sewer after construction is complete."

Compliance with the above requirements are provided through the County's comprehensive planning efforts and state and federal laws which are implemented through local ordinances, polices, education and other tools. The goal of this element is to plan and help guide future growth and development decisions and provide for protective measures for controlling pollutants from existing development and reduced impacts of new and re-development projects on receiving waters. The following topics cover those items implemented because of the above requirements:

- Comprehensive Planning for Chesterfield County
- Regulatory Amendments, Adoption and Overview of Implementation.
- Stormwater Treatment Facilities and Restoration Projects.
- The County's Environmental Management System Policy.
- County facility inspections (See §122.26 (d)(2)(iv)(B)(2))

Comprehensive Plan for Chesterfield County

The WQP (Chesterfield County, 2002) established a series of goals, policies, and implementation strategies in order to promote the protection of water quality. In 2012, the Board of Supervisors adopted the CompPlan.This document, developed by County staff, effectively replaced all previous planning documents such as the WQP. Those sections of the WQP that were still relevant were assimilated into the CompPlan. The CompPlan includes several chapters designed to address the issues and challenges that face the County as the community continues to grow and evolve. The guidelines of each chapter are based upon the principles of these goals. Achieving these goals will ensure the County continues to be a healthy, thriving community providing residents with a high quality of life, employers with a supportive business climateand visitors with positive historical, cultural, recreational and shopping experiences. The goals ensure that valued environmental resources are protected and where appropriate enhanced, through fair regulatory practices and regulations while accommodating growth and development consistent with the CompPlan. By incorporating environmental and sustainability principles, the CompPlan helps to ensure that what benefits present generations will not diminish the needs and aspirations of future generations. In 2012, VA DCR staff in consultation with Planning, provided comments thateither were incorporated into the draft CompPlan or could be addressed during future amendments.

During 2013, the County, guided by Planning, initiated steps necessary to carry out the goals and guidelines outlined in the Implementation Chapter of the CompPlan. The steps for implementation of the CompPlan fall into two categories, Phase 1 and Phase 2. Phase 1 contain steps that must be implemented quickly to carry out the CompPlan's major goals and guidelines. The majority of Phase 1 steps were completed in 2013 with remaining steps expected to be completed in 2014. Phase 2 contains steps that will occur over a period of time to refine and enhance existing ordinances, plans, policies, strategies and educational programs. Many steps will require public participation and review, and approval by either, or both, the Planning Commission and the Board of Supervisors. The on-going progress, for only those components thatare directly related to stormwater improvement or permit compliance will be addressed within this report. Details of the CompPlan as well as the progress can be found on the county website at: http://www.chesterfield.gov/cp/.

Phase 2 - Implementation Scheduled to begin in 2013:
Virginia Stormwater Management Program
Current law and regulation require localities in the Commonwealth, designated as MS4s,to adopt a VSMP approved by and in accordance with the State Water Control Board. One of the key elements of the VSMP is a local ordinance that is consistent with the Stormwater Management Act and its attendant regulations which includes the General Permit for Discharges of Stormwater from Construction Activities. In 2013, staff proposed amendments toCounty ordinance Chapter 8 section 8-1 through 8-16 in accordance with the VSMP Regulations (9VAC25-870). The regulations provide localities the ability to manage the quantity and quality of stormwater runoff from construction activities. In 2014, it is anticipated that the amendments will be approved by the State Water Control Board and adopted by the County Board of Supervisors.

Phase 2 - Implementation Scheduled to begin in 2014:

Educational Programs

Develop environmental awareness and educational programs and where appropriate, partner with the community, schools and libraries to educate the public on:

- water conservation practices,
- water resource protection, such as daily practices, low impact designs, stream and shoreline erosion,
- historical and cultural resources and preservation and
- water quality BMPs.

Water Quality

Amend ordinances to address countywide application of Upper Swift Creek Ordinance with respect to:

- Development standards, such as setbacks from RPAs, reduction in the amount of impervious areas, limited clearing in non-RPA floodplains and
- RPAslocated in open space for new developments.

Consider measures to reduce stormwater runoff associated:

- with the application of fertilizer and pesticide from golf courses and
- removing trees for the purpose of future development.

Erosion and Sediment Control

Revise existing policies to ensure that adequate ESCs are in place and properly maintained during construction.

Regulatory Amendments, Adoption and Overview of Implementation

Regulatory Actions

In 2013, the EE did not publicly consider any regulatory amendments or adoptions were with respect to the County's ESC, CBPA, Floodplain Management, and Upper Swift Creek Watershed Ordinances.

Erosion & Sediment Control Ordinance

The current version of the County'sESC Ordinance (Chapter 8, Sections 8-1 thru 8-17 "Erosion and Sediment Control") may be found in the County Code.The regulation is to control soil erosion, sedimentation and non-agricultural runoff from regulated "land-disturbing activities" in order to prevent degradation of property and natural resources.

In 2010, EEimplemented an in-house developed Program Administration Status System (PASS) to provide on-line records keeping for state mandated requirements for plans review, project inspection activities, frequency and regulatory performance reporting. During 2013, a quality control process was established in order to assess the program'sperformance with respect to the effectiveness and efficiency of inspections. Modifications to the inspection's program becauseof thenew process will be assessed in 2014. Beginning in FY2014, EE has been allocated two

additional positions to assist with inspections related to the VSMPpermit to be administered by MS4 localities after July 1, 2014.

Chesapeake Bay Preservation Ordinance
The current version of the County's Chesapeake Bay Preservation Ordinance (Chapter 19, Article IV, Division 4, "Chesapeake Bay Preservation Areas") may be found in the County Code. The regulation is designed to protect and improve water quality in the Chesapeake Bay and its tributaries by requiring the use of effective conservation planning and pollution prevention practices when using and developing environmentally sensitive lands.

During 2013, the County continued its implementation of the CBPA and made improvements to the review process for requests for encroachment within RPA. The series of informational draft guidance documents used to standardize the review process were revised in 2013. Once finalized these draft documents and application will be available on the county website.

Resource Protection Area Designations
WQ staff is responsible for the administration of the RPAD process. Per the requirements of the CBPA, this process identifies environmental features on parcels that require a RPA. At the completion of the process, the identified features are mapped and the RPA boundary drawn around them. This process is completed prior to the tentative subdivision review, commercial site plan review and water quality impact assessments.

During 2013, WQ staff conducted 65 RPADs. Of those designations, 20 were conducted on behalf of landownersand 45 were field verifications of private sector assessments. These efforts yielded approximately six miles of new perennial streams protected by RPAs buffers. To date, approximately 912 miles of perennial streams are covered by RPA in the County.

Resource Protection Area Development
During 2013, the County received 30 proposals for encroachment within the RPA. Of those proposals,three required a formal process with approval from the Board of Supervisors, the remaining 27 required an informal process or administrative with approvals fromEE.

Formal Exception Status
Of those requests before the Board of Supervisors, two were part of subdivision developments and one was for an existing single family home. All requests for RPA encroachments were granted.

Administrative Approval Status
The following Table 5 provides the details of those requests for encroachments within the RPA that required EE approval.

Table 5. RPA encroachment requests (administrative) categories, 2013.

Type of Encroachment	Number Requested	Description	Number Approved
Expansion Sec.19-236	7	Existing Structure	6
Exempt Activities Sec.19-234a	2	Passive Recreation Trails	2
Permitted By Right Sec.19-232a	8	Water Dependent Activity (6) New Construction (0) Redevelopment (1) Private Driveway (1)	7
Buffer Modifications Sec. 19-232c	10	Access (2) Views & Management (7) Shoreline Stabilization (1)	8

Resource Protection Area Violations

During 2013, 14alleged RPA violation investigations were conducted. Six (6) required enforcement actions because of improper disturbance or clearing of the vegetation within the RPA. Theseidentified projects required a site visit followed by the submission of a restoration plan. The plan outlined the area to be replanted or altered based upon the CBPA approved WQ's replanting guidelines. At the time of this report several of the cases were still on going and had not been resolved, therefore average length of time between the identification of the restoration project and the receipt of the corresponding approved corrective planting plan could not be determined.

Floodplain Management Ordinance

The current version of the County's floodplain management ordinance (Chapter 19, Article III, Division 3, "Floodplain Districts") may be found in the County Code. The regulation restricts construction in flood plains, to prevent loss of life and property, hazards to health and safety, disruption of commercial and government services and to limit the unnecessary or excessive expenditure of public funds for flood protection.

During 2013, the County received and granted two administrative variances. Both were for single-family residential homes and pertained to encroachments within the County required structural setback (25 feet or within the Upper Swift Creek Watershed 35 feet) from the existing floodplain boundaries. No public variances were brought before the County's Board of Zoning Appeal in 2013.

Upper Swift Creek Watershed Ordinance

The current version of the County'sUpper Swift Creek Watershed Ordinance (Chapter 19, Article IV, Division 5, "Upper Swift Creek Watershed") may be found in the County Code. The regulation provides for additional practices designed to address pre and post development practices within the Upper Swift Creek watershed for protecting the water quality of Swift Creek Reservoir, a source of the County's drinking water. Primarily the regulation limits residential subdivision development to a post-development total phosphorous load of 0.22 pounds per acre per year.

Development Review
EE and Planning staff review plans for proposed development for compliance with the above referenced ordinances. During 2013, between these two departments, 146 plans were approved. Of those plans approved,81 were for commercial or industrial developments (site plans),40were for subdivisions and 25 were for other categories.

Stormwater Treatment Facilities and Restoration Projects

As a result of the WASP assessments, the Pocoshock & Falling Creek watersheds were targeted in 2003 as "priority streams" requiring detail watershed investigations for pollution source(s) identification and mitigation practices.

Pocoshock Creek Stream Restoration Project
To assist in this effort, the County in 2004 initiated the Pocoshock Creek Community Partnership. This is a coordinated effort between area residents, businesses and the County to improve water quality and physically restore portions of the creek that have become degraded. The stream restoration covers approximately 5,500 linear feet and should improve the functions and value of the impaired stream channel by improving water quality and aquatic habitat in the creek, establishing a geomorphically stable stream channel using natural channel design principles and reducing the sediment load carried from the creek to Falling Creek Reservoir. As part of this project, the County contracted with KCI in 2003 for the development of design and construction plans for the stream restoration. In 2004, the County received the 30% construction design plan and the initial U.S. Army Corp of Engineers permit submittal package. No action was conducted on this project in 2013, progress on this project will be reevaluated during 2014 in order assess whether or not the project is still consider a viable option moving forward.

Regional Stormwater Facility and Mid-Lothian Mines Park Stream Restoration Projects
In 2010, the County received a VWPP Individual Permit (Number 09-0471) for LTC 20/25 facility part of Watershed Management Master Plan and Maintenance Program for the protection of water quality draining to Swift Creek Reservoir. The proposed LTC 20/25 facility is a watershed level retention pond located in the Little Tomahawk Creek watershed. The wet pond area of the facility will cover approximately 4.0 acres. The facility will reduce pollutants from stormwater runoff and attenuate flows from a 368-acre drainage area of existing development. The calculated annual pounds of total phosphorous reduced from stormwater as a result the facility is projected to be 234.1 pounds per year. The Mid-Lothian Mines Park stream restoration project, located in the Falling Creek watershed, was selected to provide mitigation for the stream impacts as a result of the construction of LTC 20/25. The mitigation project would provide 1747 linear feet of credit to meet the 1115 linear foot compensation requirements from LTC20/25. The restoration effort also includes retrofitting three stormwater outfalls that currently discharge untreated stormwater runoff into this segment of the stream. The calculated annual pounds of total phosphorous reduced from stormwater as a result the facility is projected to be 115.6 pounds per year.

During 2013, construction plans for both projects were finalized. The construction bid documents are scheduled for completion in early 2014 with construction beginning in the spring of 2014. Construction for both projects should be completed with seven months after initiation.

Riparian Buffer Maintenance

Chesterfield Water Quality Section staff conducted five site inspections at prior buffer plantings: Swift Creek at Bailey Bridge Road, Swift Creek at Pocahontas State Park, Pocoshock Creek at Twilight Lane, Falling Creek at Meadowbrook Apartments and West Branch at Burnt Mills Lane. Each site was assessed for plant survival and maintenance needs. Tree tubes and stakes were removed from plants that did not survive and from those that no longer required shelter.

The Swift Creek site at Pocahontas State Park continued to show satisfactory progress. Improved maintenance practices have allowed the site to recover and naturally occurring plants and trees have become established. The site shows approximately 50-70%coverage.

The Swift Creek site at Bailey Bridge Road was found to be in poor condition. In the fall of 2013, a Chesterfield WaterTrends volunteer reported that much of the site had been bush-hogged for maintenance access. In 2014, EE will coordinate with Utilities to implement a replanting and maintenance plan that will sustain a healthy buffer and allow access for sewer maintenance.

The Pocoshock Creek site at Twilight Lane continued to show a high degree of success (>70%). This site will be monitored in the future but EE staff anticipates that no further maintenance will be needed.

The sites at Falling Creek and West Branch were both planted in 2010 as part of the Riparian Stewardship Program. The site on West Branch at Burnt Mills lane exhibited a good overall success rate (>65%).Some areas close to residential lots have been mowed. WQ staff will work with residents to promotebetter stewardship.

The Meadowbrook Apartments site showed a moderate improvement since 2012. In 2013, the remaining trees grew well and volunteer growth has supplemented trees surviving from the 2010 planting. The site shows approximately 50% coverage. WQ staff will continue to monitor the site.

Environmental Management Policy

The August 31, 2007 update to the County's Environmental Management Policy remains current and in effect. The policy is considered the foundation for the County's Environmental Management System (EMS) and emphasizes a commitment to regulatory compliance, pollution prevention and continuous improvement, especially related to County property and facilities. A copy of this updated policy memorandum and letter is again included in Appendix A.

(3) "A description of practices for operating and maintaining public streets, roads and highways and procedures for reducing the impact on receiving waters of discharges from municipal storm sewer system, including pollutants discharged as a result of deicing activities."

Operating and Maintaining Public Transportation

As has been reported in previous years, the VDOT maintains 99% of the roads in the County, and the County has no authority to regulate that agency. No changes to regulatory authority or processes were required or implemented in 2013.

Stormwater and Stream System Maintenance

Drainage staff continues to maintain a database for recording stormwater and stream system maintenance. The database tracks field installation events, and maintenance or repairs completed. The system also categorizes the service events according to the type of service performed (*i.e.* leaves removed, removal of downed trees, *etc.*). The 2013 data showed that the majority of material removed from the system was vegetative debris and sediment, with a very small fraction falling within the trash category. During 2013, Drainage staff performed maintenance activities on 185.26 miles of storm sewer infrastructure. Staff will continue to review these reports and make any modifications to the Stormwater Management Program that are deemed necessary based on the information obtained.

County drainage easements are inspected at the time of state road acceptance. The County then holds a bond on those easements for 12 months after roads have been accepted into the state system. At the end of the 12-month period, another inspection is done and the developer is required to fix any problems before the bond is released. Maintenance from that point on is on a complaint driven basis. While there is no regular inspection process in place, WQ staff look for problems in drainage easements when conducting field activities such as storm sewer mapping, outfall screening and detailed watershed investigations. Any problems found or areas in need of repair are then reported to the EE Drainage Superintendent.

(4) "A description of procedures to assure that flood management projects assess the impacts on the water quality of receiving water bodies and that existing structural flood control devices have been evaluated to determine if retrofitting the device to provide additional pollutant removal from stormwater is feasible."

Flood Management Projects

Thirty-four BMP and SWM facilities were certified in the County in 2013. Twenty-four of the certified BMPs are rated for annual phosphorus removal (Table 1). The stormwater management portions of these structures work to attenuate water flows. Maintenance on these and existing facilities are discussed in paragraph one of this report.

EEinitiated a major drainage improvement project in 2013 to alleviate flooding and standing water in Huntingcreek Hills Subdivision. The drainage project is approximately 65 percent

complete, and involves constructing a storm sewer system approximately 1,800 feet in total length at a cost of $318,000.

(5) "A description of a program to monitor pollutants in runoff from operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste, which shall identify priorities and procedures for inspections and establishing and implementing control measures for such discharges.

Municipal Landfills

During the summer of 2012, as part of the County's corrective action process, four additional seep drains were installed along the eastern side slope of the Carver Heights landfill in an effort to keep leachate from day-lighting and entering the stormwater conveyance system. While the seep drains have helped to minimize leachate day-lighting on the side slope, there are observable areas of flowing water into the stormwater conveyance system, particularly after rain events and during periodic wet weather. In a continual effort to dewater these areas along the side slope, and minimize impacts to the stormwater conveyance system, the county is removing approximately 4000 gallons of groundwater from the seep trenches per week.

Additionally, the County is currently in the process of installing a permanent leachate collection system. This system will depress groundwater in the areas of the seep drains on the eastern side slope of the landfill. Capturing and depressing the groundwater in these areas will keep groundwater, impacted by leachate, below the subsurface, effectively keeping it from entering the stormwater conveyance system. The leachate collection system will move impacted groundwater to the downstream public treatment works. This project is expected to be completed by the summer of 2014.

The county operates and maintains two convenience centers for residents to dispose of household trash and debris, as well as offering many recycling opportunities. ED oversees operations at these convenience centers. In 2013, no discharges to onsite stormwater systems were observed or reported at the two convenience centers. Detailed inspection reports are available through ED upon request.

(6) "A description of a program to reduce to the maximum extent practicable, pollutants in discharges from the municipal separate storm sewer associated with the application of pesticides, herbicides and fertilizer which will include, as appropriate, controls such as educational activities, permits, certifications and other measures for commercial applicators and distributors, and controls for application in public rights-of-way and municipal."

Education & Outreach regarding Pesticide, Herbicide and Fertilizer Use

General Public

Thousands of publications are distributed every year by both WQ and Extension regarding the proper use and disposal of pesticides, herbicides and fertilizers. Numerous publications are available to the general public regarding the home use of herbicides, pesticides and fertilizers

and their effects on water quality. One such publication is *Six Steps to Cleaner Water*. A list of all water quality related publications is detailed in Table 3. These publications are available through a number of means including walk-ins, telephone requests, the Internet and seminars. In 2013, 152 residents registered for six lawn care seminars across the county that focused on using alternatives to turf, converting to warm-season turf, proper fertilizing and weed control strategies to protect water quality and conserve water. Additional seminar registrations include 431 registrants for seminars on various topics, including proper tree care and pruning, shade gardening, gardening with native plants, gardening for wildlife, preparing the garden for winter and appropriate plant selections. Native plants are better adapted to the County's local climate and have less need for fertilizer and pesticide use.

Extension again implemented the Grass Roots program for county residents. In 2013, 308 residents participated in the program. This accounted for 532 soil samples analyzed and over 3,147,700 square feet of privately owned turf enrolled in program. Registration for this program is conducted on a first-come, first-serve basis. Volunteer master gardeners make site visits to registered homeowners during which the master gardener measures the lawn(s), collects soil sample(s), and evaluates the health of the lawn. The Agriculture and Natural Resource Technician makes personalized fertilizer and pH adjustment recommendations to each homeowner stressing integrated pest management and the September, October, and November fertilizing program for cool-season lawns. The Grass Roots program provides numerous lawn care publications as needed and four quarterly newsletters. Turf enrolled in the Grass Roots program is included in the total square footage of turf under VADCR nutrient management plans.

In addition to providing valuable information to residents, Extension is conducting surveys among Grass Roots participants to evaluate lawn care practices such as timing for fertilizer application. Results of the most recent survey (2011) indicated that 89% of the respondents fertilized following the September, October, and November fertilizing program, 89% actively kept lawn products out of the storm drain and 92% practiced integrated pest management.

WQ and Extension also use the *List of Lawn Care Operators with Water Quality Agreements* that is maintained by the VA DCR. This program certifies applicators of herbicides, pesticides and fertilizers who enter into a voluntary water quality agreement "by following proper lawn fertilization practices and recommending sound homeowner lawn maintenance practices by following a Nutrient Management Plan approved by VA DCR". The lawn care companies also agree to teach their employees to use the Nutrient Management Plan to responsibly apply and handle lawn care products. There are currently seven commercial lawn care companies in the Richmond area that serve the County who are on the list. The list can be found at: http://www.dcr.virginia.gov/soil_and_water/documents/wqagree.pdf.

Commercial and Municipal Applicators

Both private and commercial applicators of pesticides are required by Code of Virginia (2VAC20-51-20) to hold a current Virginia Pesticide Applicator's Certificate, as regulated by the VDACS. Municipal applicators are included in the commercial, not-for-hire category. To become certified, the individual must follow a three-step process. 1: The individual must apply for a license. 2: The individual mustsubmit a nonrefundable certification fee unless otherwise

exempt. 3: The individual mustpass an examination that demonstrates the individual's education and training in pesticide application for a designated category appropriate for the type of pesticides used. After passing this examination, certified applicators are required to renew their certification every two years by attending a VDACS Board-approved recertification course during the two-year period. Approved recertification courses are offered by numerous organizations including Extension. Currently, the County Agent participates in joint regional recertification programs that are conducted throughout the year at various locations including the County, Prince George, and Henrico Counties. Commercial pesticide applicators nearing the end of their two-year certification are notified by mail of the upcoming, qualified courses and urged to attend. The County Agent assisted with two 42-hour initial certification trainings with J. Sergeant Reynolds Community College. Fourteen students took part in each of the two sessions for a total of 28 students in 2013. One session was held at the County Extension office and the other took place at J. Sergeant Reynolds Community College in Goochland County.

§122.26 (d)(2)(iv)(B) "A DESCRIPTION OF A PROGRAM, INCLUDING A SCHEDULE, TO DETECT AND REMOVE ILLICIT DISCHARGES AND IMPROPER DISPOSAL INTO THE STORM SEWER"

The major tasks currently being implemented to conform to the above requirement are as follows:

- Water quality investigations and enforcement;
- Private sanitary system investigations and enforcement;
- Public sanitary system maintenance and repair
- FEMS spill response;
- Storm drain marking program;
- Field screening evaluations;
- Detailed Watershed Investigations and Assessments, and;
- Management and Disposal of Used Oil and Toxic Materials.

(1) "A description of a program, including inspections, to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the municipal separate storm sewer system."

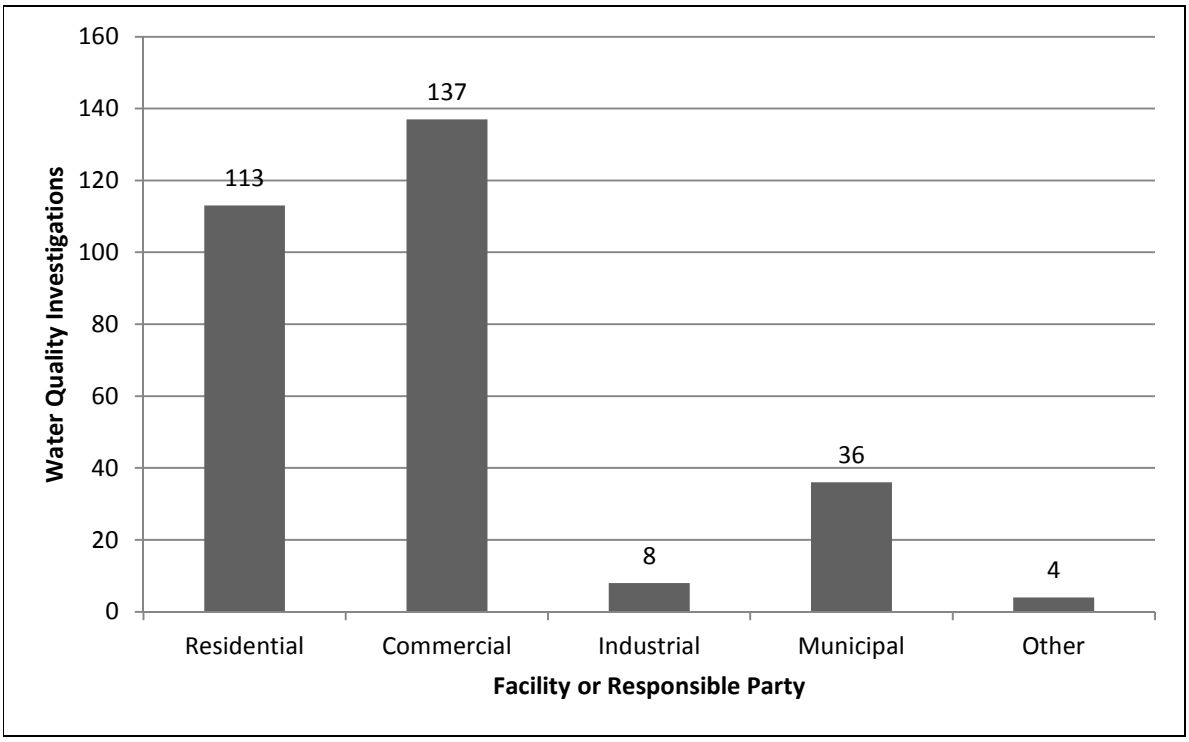
Water Quality Investigations and Enforcement

WQ staff performed 298 investigations in 2013 regarding water quality concerns, spills and other environmental concerns. Reports from residents, various county and state departments or WQ staff initiate these investigations. Of those investigations, 215 were illicit discharge investigations, 56 were other water quality or environmental concerns and 27 were municipal sewage releases to surface or stormwater systems. Figure 1 depicts the types of facilities or responsible parties involved in the water quality investigations. Figure 2 depicts the categories of illicit discharge investigations.A summary of all water quality investigations conducted in 2013 is included in Appendix A.

The number of investigations conducted represents more than a doubling from 2012.The increase in total investigations is largely due to increased field presence by two new staff hired by the department in 2012 to perform illicit discharge detection and elimination tasks. One employee focuses on water quality investigations and enforcement, commercial/industrial inspections, and spill response while the other focuses on outfall screening and watershed investigations.

Nearly half of the 298 investigations were at businesses or the responsible party was identified as a business, either commercial or industrial (Figure 1).These incidents often involve restaurants, grocery stores, pressure washers, mobile vehicle washers and construction-related businesses. The 36 municipal incidents include 27 municipal sewage releases, 3 concrete wash out incidents at county facilities and a variety of other issues. Three of the four incidents identified as "Other" were related to the VDOT or its contractors.

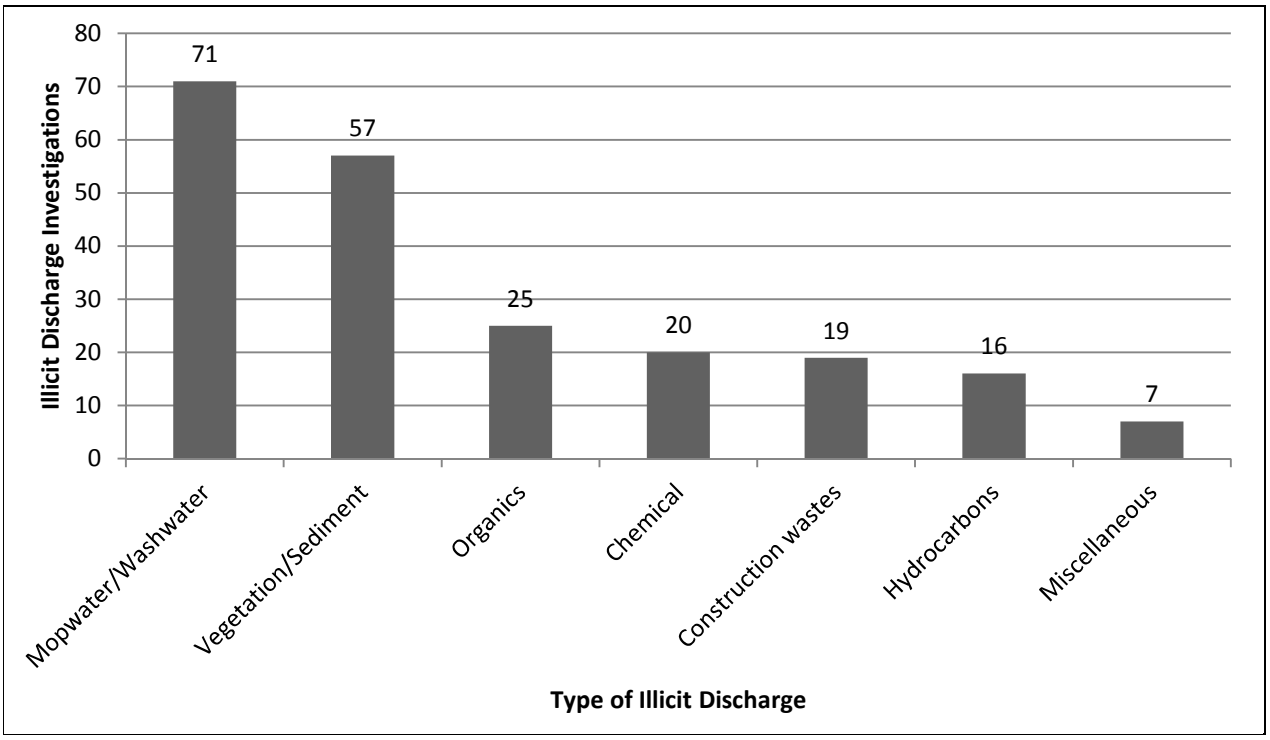
Figure 1. Water quality investigation categories, 2013



The category of water quality concern represented a variety of environmental issues, often resulting in referral to other sections within the County or other state and federal agencies after investigation by WQ staff. Common issues falling under the category of water quality concern include sheens from iron bacteria, algal blooms, illegal dumping not associated with surface or stormwaters, drainage or erosion concerns and the filling of wetlands or other water bodies best addressed through remedies other than the IDO.

The 215 illicit discharge investigations were divided into seven categories, as illustrated in Figure 2.A new category, construction wastes, was created to represent paint, sheetrock mud, concrete washout and slurry, solvents and construction debris. These items had previously been included in the miscellaneous category. The mopwater/washwater category included improper discharges from mobile and fixed vehicle washing, restaurant and equipment cleaning, pressure washing, cleaning of air conditioning coils and indoor cleaning activities where the wastewater was disposed of outside. Most incidents within the vegetation/sediment category represent the improper disposal of yard debris into the drainage system, while a few incidents are discharges of soils and sediment. The organics category included non-municipal sewage releases, grease and compost spills at food service establishmentsand liquid drippings from trash trucks, dumpsters and compactors. Examples of the chemical category included discharges from swimming pools and industrial spills.The hydrocarbon category represented releases from vehicle accidents, auto repair shops, home vehicle repair, construction equipment leaks and home heating oil.The miscellaneous category included dumping of trash and the use of an improper dye by a company testing the integrity of their stormwater system.

Figure 2. Number and types of illicit discharge investigations, 2013



In some cases, multiple NOVs were issued for a given incident; for example, property owner, tenant and contractor were all eligible to receive NOVs. A total of 100 NOVs representing 86 incidents were issued as enforcement actions of the IDO. Illicit discharge investigations often result in corrective actions even when an NOV is not issued. For example, if a release or spill had not yet reached the stormsewer system, an NOV may not be issued but a corrective action such as vacuuming up the product may be requested. Similarly, in 2013 WQ staff began sending warning letters to potentially responsible parties when the complaint was about yard debris dumped in the drainage system. A follow-up inspection was performed approximately two weeks after the letter was mailed and if the problem had been resolved, no NOV was issued.

Private Sanitary Systems Investigations and Enforcement

Health is tasked with responding to complaints and issues regarding private sanitary systems (septic tanks and drainfields) in the County. Although many of these may not directly affect the County storm sewer system, many have the potential to affect groundwater and may potentially discharge to the County's MS4 and surface waters. As a result, data regarding Health's efforts as they may relate to preventing illicit discharges are included in this report. In 2013, Health investigated 87 septic complaints and issued 260onsite sewage repair permits in the County. Because of the complaint responses, investigations and onsite inspections, Health issueda total of 40 Notices of Alleged Violation during 2013. Additionally, Health received documentation relating to 5,149 septic tank pump outs and 266 Alternative Onsite Sewage System inspections conducted in the County during 2013.

Public Sanitary System Maintenance and Repair

Wastewater maintained approximately 1,984 miles of sanitary sewer lines and responded to 20 reportable public sanitary sewer incidences during calendar year 2013. Of the 20 reportable incidents, the top three causes for the overflows were: overflows due to accumulation of grease (six) in various locations in the collection system, overflows at the Johnson Creek Pump Station (five) and relatively small overflows (five) during a significant by-pass pumping operation due to a single catastrophic failure of a 18-inch sanitary sewer main off Hull Street Road. For the incidents related to grease accumulation, Utilities cleaned the lines, provided educational materials about the proper disposal of fats, oils and grease where practicable and added the locations to the sites that require more frequent preventative maintenance inspection and cleaning. In response to the overflows at the Johnson Creek Pump Station, the collection system was inspected and the wet well and grit chamber cleaned by a private contractor to restore the facilities to their original designed capacities. New pump impellers have been ordered and will be installed once they are received. The site acquisition and subsequent design for the replacement of the Johnson Creek Pump Station has been accelerated and is scheduled to begin in fiscal year 2015. In response to the catastrophic failure of the 18-inch sanitary sewer line, in addition to the needed repair at the point of failure, approximately 1,315 feet of existing 18-inch through 36-inch sanitary sewer in the area was rehabilitated along with 10 existing manholes. Copies of the incident reports submitted to the VA DEQ are included in Appendix A.

Fire Department Spill Response

FEMS reported fourteen occurrences in 2013 where FEMS personnel were dispatched to address incidences involving either the direct release of product to the County stormsewer system or where there was a high probability a release would occur if not immediately remediated (Table 6).

Of these fourteen, ten were related to vehicle fuels released due to accidents, ruptured fuel tanks/lines or pump malfunctions. During the January 1, 2013 incident, fire personnel secured the site and provided advice on disposal/cleanup. In all remaining listed incidents, fire personnel secured the site and contained the product with subsequent mitigation and cleanup operations performed by either HAZMAT personnel or commercial contractors. Additionally, FEMS personnel responded to multiple incidences during the course of the year involving insignificant fluid releases from vehicle crashes not impacting the storm sewer system. In these cases, absorbents were applied to prevent the spread of the fluids and cleanup was conducted as required. Detailed reports of each incident are archived and are available for review at the FEMS office.

Table 6. Responses by Chesterfield County Fire and EMS involving MS4, 2013

Date	Address	Event	Product	Source
01/01/13	10214 Renfro Road	Release	Gasoline	Vandalism – Deliberate Dumping
03/10/13	6001 Iron Bridge Road	Leak	~ 2 Gal. Gasoline	Leaking Fuel Tank – Truck
03/12/13	Route 288 South at Courthouse Road	Leak	~ 10 Gal. Diesel Fuel	Leaking Fuel Tank – Truck
04/03/13	10900 PegwellDrive	Leak	~ 1 – 2 Gal. Motor oil or Transmission Fluid	Vehicle Accident
04/22/13	Hull Street Road & Woodlake Village Parkway	Leak	10 – 15 Gal Diesel Fuel	Damaged Saddle Tank – Vehicle Accident
04/30/13	I-95 South between Willis Road & Route 288	Leak	Diesel Fuel	Damaged Saddle Tank
05/02/13	21431 Hull Street Road	Leak	Gasoline	Leaking Fuel System
07/03/13	5400 Jefferson Davis Highway	Spill	~ 25 – 35 Gal. Gasoline and Diesel Fuel	Collision with Gas Station Fuel Pump
07/13/13	13903 Bayport Landing Road	Release	Latex Paint	Washing Paint Equipment
08/03/13	I- 295 South at Route 10	Leak	~ 10 Gal. Hydraulic Fluid	Vehicle Accident
08/16/13	I- 295 North at Route 10	Leak	Sodium Hypochlorite	Damaged Transport Tote
09/18/13	11021 Iron Bridge Road	Leak	~ 10 Gal. Gasoline	Malfunctioning Fuel Pump
10/08/13	15912 Longlands Road	Release	Paint Thinner	Deliberate Dumping
12/03/13	15821 Branders Bridge Road	Spill	Gasoline and Diesel Fuel	Vehicle Accident

Storm Drain Marking

A total of 164 storm drain placards were installed throughout the County in 2013. A total of 99 storm drain placards were installed by the Volunteer Storm Drain Marking program. Details of this program are presented in §122.26 (d) (2) (iv) (A) (1) *A Description of Structural and Source Control Measures to Reduce Pollutants from Runoff from Commercial and Residential Areas that are Discharged from the Municipal Storm Sewer System*of this report.EE staff placed an additional sixty-five (65) placards on inlets as part of a Supplemental Environmental Project begun in 2012. The Supplemental Environmental Project also includes distribution of spill kits and pamphlets describing BMPs to food service establishments and auto repair facilities.

(2) "A description of procedures to conduct on going field screening activities during the life of the permit, including areas or locations that will be evaluated by such screens."

Field Screening Evaluations

WQ staff continues to implement the IDDEField Screening Program. The purpose of this program is to identify and investigate non-stormwater flows that are entering the County's stormsewer system, and to eliminate those non-stormwater flows if they are not one of the authorized discharges allowed by the IDO. This program was designed using the recommendations of the Center for Watershed Protection's *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments,* October 2004.

In 2013, a total of 515 outfalls and upstream structures were screened using protocols described in the County's *Outfall Reconnaissance Inventory Standard Operating Procedures Addendum*(last revised January 23, 2012).Of the 515 structures screened, three outfalls (0.01%) were characterized as having potential or obvious illicit discharge flows. Additionally, during laboratory analysis, one outfall was found to have dry weather flow containing elevated ammonia levels. Follow-up inspections were conducted at these four outfalls revealing the following:

- Outfall 796-658-05 was found to have evidence of historic dumping of paint and/or sheetrock mud. Residual powders and stains were cleaned up by the property owner.
- Outfall 796-646-03 contained spilled food grease, which was cleaned up by County staff. No responsible party could be found, but nearby residents were educated about the storm sewer system and improper disposal prevention.
- Outfall 796-658-04 appeared to have a flocculent in the plunge pool that was determined to be suspended clays.
- Outfall 748-706-01 was found to have elevated ammonia levels. Upstream structures were inspected and a CCTV inspection of the storm sewer pipe was performed.The ammonia levels may be attributed to groundwater or significant presence of iron-reducing bacteria.

The following is a brief summary of the Field Screening Standard Operating Procedure:

1. A desktop evaluation is performed to identify specific locations or drainage areas with significant potential to contain contaminated dry weather flows and to identify areas that have not been screened in recent years.
2. Field screening of physical and chemical parameters is conducted to identify those outfalls with dry weather flows or indicators of contaminated intermittent flows at non-flowing outfalls.
3. Detailed investigations are conducted when contaminated flows are identified or suspected in order to identify the source(s) of the contamination. These detailed investigations may require source tracking, dye testing and other investigatory methods.
4. Pollutant sources are eliminated when identified, under the authority of the IDO and other regulations and codes.

The field inspection process consisted of collecting general information and a description of the outfall and upstream system. For the outfalls exhibiting dry weather flows, additional instream physical and chemical measurements were obtained through field and laboratory analysis of samples using a two-tiered testing regime of indicator parameters. All dry weather flows were field analyzed with a Hydrolab Minisonde 4a and Surveyor for the following parameters: dissolved oxygen, pH, conductivity, total dissolved solids, and temperature. Additionally, samples from all dry weather flows were analyzed in the WQ laboratory for the following tier one parameters: ammonia nitrogen, nitrate+nitrite nitrogen, phosphate phosphorus, turbidity, fluoride, potassium, surfactants and calcium hardness. Some dry weather flows were analyzed for one or more of the second tier parameters which include: alkalinity, *E. coli*, nitrite nitrogen, and total chlorine.

Field observations and data collected from both field and laboratory results were archived in the Outfall Screening Database. Copies of completed field screening outfall inspection check sheets from the 2013 reporting year can be found in Appendix A.

Seventeen upstream structures were inspected in lieu of an inspection at the outfall because the outfall was submerged or inaccessible. Of the total 515 inspected structures (including outfalls and upstream structures), analyses were conducted for 115 (22.3%) that had dry weather flows or standing water.A table summarizing the chemical data from these structures can be found in Appendix A.

WQ staff wrote a SAP in 2013. Additions and revisions to the SAP will bewritten on an as needed basis. Last revised on February 27, 2013, a copy is provided in Appendix A.

In addition to the outfall screenings conducted by WQ staff, ED retained the services of the consulting firm Koontz-Bryant, P.C. to monitor stormwater outfalls at the County airport complex. This monitoring is conducted to fulfill requirements of the airport's VPDES Industrial Stormwater General Permit and is included in this report as the stormwater outfalls drain to County waters. During 2013, staff from Koontz-Bryant visually monitored eight outfalls on a quarterly basis at the County airport complex for a total of thirty-two outfall screenings.Generally, the results of the outfall screenings indicated no significant issues related to stormwater discharges.

On May 30, 2013, personnel from Koontz-Bryant visited with airport staff and conducted an onsite annual SWPPP compliance evaluation. The evaluation included reviews of existing worksheets and plans, inspections of spill response equipment and visual assessments of the eight outfalls. The results of this evaluation indicated there were no incidents of non-compliance identified for FY 2013 and that the airport was meeting the requirements of the facility's SWPPP and related VPDES discharge permit. Included in Appendix A are copies of the FY 2013quarterly reports, the first two quarterly reports of FY 2014 submitted to the County and the FY 2013compliance evaluation.

The County operates an outdoor firearms range at the Public Safety Training Area near Enon for law enforcement personnel weapons training and qualification. Concerns over soil accumulation of lead residue from bullets and the consequent discharge of stormwater containing and

transporting lead via the storm sewer system to Johnsons Creek prompted annual monitoring of these areas. Since 2005, ED has contracted for sediment sampling of the stormwater channel draining the onsite stormwater management basin and Johnsons Creek for lead. Six soil samples along said channel and four in-stream sediment samples of Johnson Creek were obtained on November 9, 2012, analyzed for lead, and compared to previously obtained values. Lead concentrations among the ten sites surveyed ranged from <4.3 to 32 mg/Kg and were evaluated as similar to previously observed values. All of the measurements recorded were substantially lower than the 400mg/Kg human health risk based screening level for residential scenarios and the 800mg/Kg human health risk based screening level for commercial exposure scenarios recognized by VA DEQ. None of the samples taken between 2005 and 2012 have exceeded 100 mg/Kg, thus suggesting a limited lead impact to the stormsewer system and creek. Therefore, in 2013 it was decided testing will now be on a biennial schedule until such time a more frequent schedule is indicated. The next sampling event will is scheduled in the fall of 2014. A complete copy of the 2012 sediment sampling report is included in Appendix A for further review.

(3) "A description of procedures to be followed to investigate portions of the separate storm sewer system that, based on the results of the field screen, or other appropriate information, indicate a reasonable potential of containing illicit discharges or sources of non-stormwater (such procedures may include: sampling procedures for constituents such as fecal coliform, fecal streptococcus, surfactants (MBAS), residual chlorine, fluorides and potassium)…"

Detailed Investigations and Watershed Assessments

Unnamed Tributary to the James River- Eastern Drainage in Robious Landing Park

A detailed watershed investigation of the eastern drainage flowing through the County's Robious Landing Park was conducted on May 17, 2013 in response to indicators of nutrient pollution and elevated *E. coli* concentrations detected during the WASPand *E. coli* screens. The purpose of this investigation was to visually assess the watershed for potential sources of the nutrient and coliform pollution. To complete the inspection, WQ staff walked the length of the stream to assess the general physical stream condition, state of the riparian buffer and generally identify any potential sources of pollution that may require further more thorough investigation.

The watershed is approximately 138 acres in size and is 1.2 linear miles in length from its headwaters in the Tarrington subdivision to its confluence with the James River just east of the Robious Landing Park boundary. Aside from the watershed that lays with in the park boundary, the entire watershed is zoned residential (R-40, R-25 and R-15). There are no commercial, office or industrial zonings within the watershed. All of the homes within the watershed are recorded as connected to the municipal wastewater system.

The watershed was distinctly divided into three sections, based on stream condition and land use. The lower section, which is nearly entirely within the park boundaries, appeared to be minimally impacted, with riparian disturbances being fairly minor. Some points of erosion and trash were observed in this section of the watershed. Because this section is primarily within the boundaries of the park, it may be a suitable candidate for stream bank stabilization in future projects.

The middle portion of the watershed was notably the most impacted, with the greatest concentration of riparian disturbance in the watershed. Many residences back up to the edge of the stream; yard and landscaping debris was found to be deposited near the edge of the heavily incised channel.The scent of domestic animal waste was noted in this portion and observed as deposited near the edge of the channel. Multiple outfalls wereobserved visually examined for dry weather flows and illicit discharge indicators, but neither dry weather flows nor abnormal conditions were found to exist at any of the outfalls along this section of the watershed.

The upper portion of the watershed lies within an undeveloped section of the Tarrington neighborhood, but surrounding development appears to have minimally impacted the watershed. The riparian buffer in this portion of the watershed was overall in good condition. The headwaters were traced back to a stormwater management facility which appears to be functioning normally and well maintained.

Nutrient and *E. coli* pollution appeared to stem from residential impacts along the middle portion of the watershed. The residences within this section of the watershed were observed having intensively managed turf and gardens, which suggest that nutrient pollution may be originating from fertilizer application habits. The elevated *E. coli* levels may be attributed to the pet waste dumping that was noted in the same section of the watershed. The diminished riparian buffer may also be contributing to the noted heavy erosion and nutrient pollution.

Grindall Creek

WQ staff conducted a detailed watershed investigation of the Grindall Creek watershed beginning on October 24, 2013 and concluded on December 11, 2013. The investigation was conducted in response to poor water quality found during the WASP chemical assessment screens. The purpose of the study was to identify potential point and non-point sources of pollution within the watershed that may be degrading stream health.

Grindall Creek's headwaters are in the City of Richmond. Within Richmond, Grindall Creek is piped underground before entering a concrete open channel that outfall into a natural channel at the city/County border. The creek flows into the County just west of Jefferson Davis Highway, at Walmsley Boulevard. The creek then travels 1.8 miles to its confluence with Falling Creek. The size of the watershed is approximately 520 acres and is composed of residential, commercial and industrial properties.

WQ staff used bracketing methods typically used in illicit discharge detection and elimination to divide the watershed into four sectionsand strategically selected five sampling sites. On October 24, 2013, WQ staff visited each of the five selected sites and collected *in situ*readings and samples for laboratory analysis. A Hydrolab Minisonde MS4a and Surveyor were used to collect the field readings which include: dissolved oxygen, pH, conductivity, total dissolved solids and temperature. Samples were returned to the laboratory were analyzed within 24 hours for the following parameters: ammonia nitrogen, nitrate+nitrogen, phosphate phosphorous, turbidity, fluoride, potassium, calcium hardness, surfactants and *E. coli.*

In addition to the five samplinglocations, two outfalls were screened at the Falling Creek Wastewater Treatment Plant. One of these outfalls had dry weather flow resulting in the

collection of *in situ*measurements and samples collected for laboratory analysis. Results of the field measurements and laboratory results are listed in Table 7 below.

Table 7.Results of field and laboratory analysis of the Grindall Creek Detailed Watershed Investigation, October 2013.

Site/Location	Dissolved Oxygen (mg/L)	pH (units)	Conductivity (microS/cm)	Total Dissolved Solids (mg/L)	Temperature (Degrees C)	Ammonia (mg/L as N)	Nitrate+Nitrite (mg/L as N)	Phosphate (mg/L as P)	Turbidity (NTUs)	*E. Coli* (CFU/100mL)	Surfactants (ppm)
DWI-01 Mouth, upstream of WWTP	8.61	6.74	248.1	159.8	11.26	0.01	0.20	0.01	3.0	180	0.00
DWI-02 Main stem, upstream of SR-150	7.93	6.43	257.7	164.7	13.38	0.19	0.19	0.03	4.6	0	0.00
DWI-03 Major Tributary, Cogbill Rd	8.35	7.30	169.4	108.3	13.79	0.03	0.29	0.03	3.6	0	0.00
DWI-04 Main stem, upstream of DuPont	7.51	6.76	181.2	116.6	11.94	0.07	0.23	0.03	2.9	0	0.00
DWI-05 Main stem, Walmsley Blvd	7.33	6.83	172.8	110.2	13.42	0.05	0.23	0.04	2.2	0	0.00
WWTP-02 Falling Ck WWTP	6.82	6.30	462.4	300.7	13.24	0.03	0.74	0.40	2.8	*	0.00

On October 31, November 15 and December 11 of 2013, HSIs were conducted at thirty-two commercial and industrial establishments within the Grindall Creek watershed using the Center for Watershed Protection's Hotspot Site Investigation Reconnaissance methodology and field forms.Of the 32 HSIs conducted, 20 were determined to not be hotspots, eight were potential hotspots, four were confirmed hotspots and none were classified as severe hotspots.WQ staff discovered an illicit connection where wastewater from an industrial water-jet cutter at a graphics and sign shop was being discharged to the storm sewer system. Multiple housekeeping and maintenance issues were identified and corrected at several other area businesses.

Results of the field and laboratory measurements revealed that each of the four sections had uniform results: all having elevated conductivities. These results suggest that the elevated conductivity could not be traced to one point source or general area within watershed, but instead may be attributed to the dense and intensive residential, commercial and industrial development.Additionally, the riparian area appeared to be severely impacted throughout a significant portion of the watershed and many of the developments lacked stormwater treatment facilities due to their age.

The dry weather flow sampled at the Falling Creek Wastewater Treatment Plant revealed elevated levels of conductivity, total dissolved solids, nitrate+nitrogen, phosphate phosphorous, hardness, potassium and fluoride. Results of the study are being discussed with Utilities.

Watershed Assessments of County Stream Systems

Watershed level assessments were conducted within three drainage basins in 2013; four stream sites draining directly to the Appomattox River, six stream segments draining directly to the

James River and at five reaches within the Michaux Creek watershed. The major reason for the selection of these watersheds was limited data regarding detailed water quality in these drainage systems. Additionally, these three watersheds contained stream segments currently listed on VA DEQ's impaired waters list (303d) as impaired for either not supporting aquatic life (low pH) or recreational contact (*E. coli* bacteria).

Sampling occurred in the spring as a component of the County's WASP. Physical, chemical, biological, and habitat data were collected and analyzed. Results were integrated into a multivariable approach that synthesized the bioassessment and habitat categorical data as well as select chemical observations into a single water quality index score, comparable as a percentage of an ideal reference condition (100%). The results of this analysis are outlined in Table 8. The majority of the assessments indicated good (n=8) water quality conditions.

Table8. Water quality scores and categories for assessed watersheds, 2013.

Site Number	Stream	Station Location	Date	% Comparison to Reference Condition	Water Quality
APR-01	Fleets Branch	On VSU Campus Downstream of East River Road	04/03/13	33.3	Poor
APR-02	Stoney Creek	Downstream of Trents Bridge Road	04/03/13	88.9	Excellent
APR-03	Tributary to Appomattox Rive	Downstream of St. Audries Drive	04/03/13	100.0	Excellent
APR-04	Cattle Creek	Downstream of Ivey Mill Road	04/11/13	66.7	Good
JR-04	Spring Creek	Downstream of Old Gun Road East	04/02/13	33.3	Poor
JR-05	Tributary to James River	Downstream of Ashwell Drive	03/28/13	44.4	Fair
JR-06	Tributary to James River	Robious Landing Park East of James River Road	03/28/13	33.3	Poor
JR-07	Tributary to James River	Robious Landing Park West of James River Road	03/28/13	55.6	Fair
JR-08	Marine Spring Branch	Downstream of Kings Farm Drive	04/02/13	66.7	Good
JR-09	Roberts Branch	Upstream of Crossings Way	04/02/13	66.7	Good
MCX-01	Michaux Creek	East of RT288	04/10/13	66.7	Good
MCX-02	Tributary to Michaux Creek	East of RT288 - Upstream of MCX-01	04/10/13	66.7	Good
MCX-03	Tributary to Michaux Creek	Southwest of North Otterdale Road	04/11/13	66.7	Good
MCX-04	Tributary to Michaux Creek	Downstream of Lastingham Drive	04/11/13	44.4	Fair
MCX-05	Michaux Creek	End of North Otterdale Road	04/10/13	66.7	Good

Details concerning individual sites are summarized and presented in Section 2.1 of this report entitled "*2013 Assessment of the Biology, Habitat and Chemistry of Select Streams and Watersheds of Chesterfield County, Virginia"*.Details about the development of the scoring protocol are discussed in section five ("*Identification of Water Quality Improvements and Degradation*") of this report.

(6) A description of educational activities, public information activities and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials.

Management and Disposal of Used Oil and Toxic Materials

DOGS operates a public household hazardous waste program by offering the disposal of items such as paint, oil base paint, varnish, thinners, shellac, stains, tints, polyurethane, primers, varsol, mineral spirits, turpentine, various flammable solvents, oil additives, gasoline, used oil, diesel fuel, kerosene, brake fluid, anti-freeze, oil filters, pool and photo chemicals, pesticides and herbicides. The County collects the waste and contracts with a qualified firm for proper disposal

or recycling. Information regarding this program is available on the County website. Brochures are available for residents by request and are distributed at special events.

During 2013, approximately 56,889 pounds of used motor oil from Fleet were recycled either through FCC Environmental or used as a fuel at five County clean burn furnaces. Additionally, 864 pounds of used antifreeze and 10,314 pounds of oil solids, including crushed oil filters and absorbents, were collected and recycled through FCC Environmental Services. Nine oil water separator systems, one of which discharges directly to the County's stormwater system, were inspected and cleaned in May and November 2013. Aboveground oil storage tanks and piping were inspected on a monthly basis. There were no reportable oil spills in 2013 at any of the Fleet facilities as defined by the SEPAL in the Clean Water Act and Oil Pollution Act. Detailed inspection reports are available through Fleet upon request.

The County operates a Public Safety Training Area for the training of law enforcement and fire personnel. The training facility is comprised of specific areas for police and fire staff to conduct training specific to their respective operations. Examples of activities conducted here include firearms training, an emergency vehicle operations (driving) course and firefightingsuppression procedures. A limited amount of hazardous materials are present on site to facilitate the training. The use and disposal of these materials are addressed in detail within the Environmental Handbook- Standard Operating Procedures documents for the Enon Police Training Facility and the Enon Fire Training Facility.

§ 122.26 (d)(2)(iv) (C)
"PROGRAM TO MONITOR AND CONTROL POLLUTANTS IN STORMWATER DISCHARGES TO MUNICIPAL SYSTEMS FROM MUNICIPAL LANDFILLS, HAZARDOUS WASTE TREATMENT, DISPOSAL AND RECOVERY FACILITIES, INDUSTRIAL FACILITIES SUBJECT TO 313 OF TITLE III (SARA), AND INDUSTRIAL FACILITIES THAT THE MUNICIPAL PERMIT APPLICANT DETERMINES ARE CONTRIUBUTING A SUBSTANTIAL POLLUTANT LOADING TO THE MUNICIPAL STORM SEWER SYSTEM"

(1) "A program to identify priorities and procedures for inspections and establishing and implementing control measures for such discharges."

Facility Inspections

Eleven commercial and industrial facilities were inspected for stormwater compliance purposes during 2013 (Table 9), and an additional seven follow-up inspections were performed at facilities inspected in 2012 or 2013. Six industrial inspections were conducted at five facilities. One industrial inspection was a follow-up inspection from a facility inspected in 2012 and another industrial facility was inspected twice in 2013. Twelve commercial inspections were conducted at seven facilities with five follow-up commercial inspections performed.

WQ staff conducted windshield survey inspections throughout the year of commercial and industrial facilities and found many of the incidents described below in "Releases from Commercial/Industrial Facilities" or above in "Water Quality Investigations and Enforcement" as a result.

As a means of prioritizing facilities for inspection, businesses have been categorized numerically from one (least potential) to five (greatest potential) based upon their risk to the environment. Inspection protocol requires facilities that are categorized "5" or "4" be given top priority. The following list describes facilities within each category.

- "Category 5" is generally assigned to facilities that meet two or more of the following criteria: handling hazardous materials; collecting waste for treatment, disposal or recovery; having a VPDES/VSMP/RCRA/Pre-treatment Program permit; SARA Title III facilities; or the facility has had a release in the past three years.
- "Category 4" is generally assigned to facilities that have a VPDES/VSMP/RCRA/Pretreatment Permit; are a SARA Title III facility; handles hazardous waste; or are an operating or closed municipal landfill.
- "Category 3" is generally assigned to facilities that have a potential, because of their type of business, for an illicit discharge, such as automobile service centers.
- "Category 2" is generally assigned to facilities that have been known to have an occasional discharge, such as restaurants.

- "Category 1" is generally assigned to facility types that have little or no chance of an illicit discharge, such as office complexes.

Table 9. Facility inspections performed, 2013

Date	Facility	Category	Site Address	Type	Reason
2/7/2013	Yard Works LLC recycling and coloring	5	20701 Hull Street Rd	Industrial	Water Quality Investigation
2/22/2013	Marten Transport	4	800 Port Walthall Dr	Industrial	Concurrent with Pretreatment inspection
3/15/2013	J&J Tires	3	10015 Jefferson Davis Hwy	Commercial	Code Enforcement request
3/15/2013	Ed & Ted Auto Sales auto body shop	3	10015 Jefferson Davis Hwy	Commercial	Code Enforcement request
3/15/2013	D&A Auto Service	3	10015 Jefferson Davis Hwy	Commercial	Code Enforcement request
3/22/2013	AlscoInc	4	1701 Touchstone Rd	Industrial	Follow-up inspection
4/11/2013	J&J Tires	3	10015 Jefferson Davis Hwy	Commercial	Follow-up inspection
4/11/2013	Ed & Ted Auto Sales auto body shop	3	10015 Jefferson Davis Hwy	Commercial	Follow-up inspection
4/11/2013	D&A Auto Service	3	10015 Jefferson Davis Hwy	Commercial	Follow-up inspection
4/24/2013	Artis Repairs	3	9821 Jefferson Davis Hwy	Commercial	Code Enforcement request
5/7/2013	G&J Transport	3	2101 Pine Forest Dr	Industrial	Water Quality Investigation
6/21/2013	Yard Works LLC recycling and coloring	5	20701 Hull Street Rd	Industrial	Follow-up inspection
8/7/2013	Yard Works LLC retail operation	3	19001 Hull Street Rd	Commercial	Water Quality Investigation
9/3/2013	Brandermill Country Club Maintenance Shop	3	3700 Brandermill Pkwy	Industrial	Water Quality Investigation
11/7/2013	New Life for Youth Wash N Roll	2	2501 Turner Rd	Commercial	Contract compliance request
11/19/2013	New Life for Youth Wash N Roll	2	2501 Turner Rd	Commercial	Follow-up inspection
12/3/2013	Yard Works LLC retail operation	3	19001 Hull Street Rd	Commercial	Follow-up inspection
12/4/2013	Flagstop 1	2	11031 Ironbridge Rd	Commercial	Contract compliance request

In all of these inspections, copies of the *Business and Industry Guide to Chesterfield County's Illicit Discharge Ordinance* were distributed to the facility representatives. Copies of the aforementioned commercial and industrial inspection field sheets, memoranda and reports are on file withEE and are available for review upon request.

Chesterfield County Environmental Management System Compliance Audits

Eleven external environmental compliance audits were conducted by an independent contractor in 2013 to evaluate compliance with state, federal and other environmental laws and regulations. The audits were completed to satisfy the County's Environmental Management System Evaluation of Compliance Procedure. Departments and offices audited included: Animal Control, Social Services, Juvenile Detention, Lucy Corr Village, Document Services (Print Center), Emergency Operations Center 911, Police Forensics, Mental Health Rodgers Building, Day Programs, CES and CCP, Youth Group Home, Communications Center (Radio Shop) and the County Jail facility. Opportunities for Improvement were identified and are documented in

individual departmental Corrective Action Requests and followed up within 90 days of the audit for status of the findings.

(2) Describe a monitoring program for stormwater discharges associated with the industrial facilities identified in (d) (2) (iv) (C) of this, to be implemented during the term of the permit, including the submission of data on the following constituents: any pollutants limited in effluent guidelines; any pollutants listed in an existing NPDES Permit for a facility; oil and grease, COD; pH; BOD5; TSS, total phosphorous, TKN, nitrate plus nitrite nitrogen.

Releases from Industrial Facilities

Eight potential releases from industrial facilities were the subject of water quality investigations, as noted in Figure 1 and Table 10.

Table 10.Industrial facility potential releases, 2013

Date Inspected or Reported	Facility	Category	Site Address	Incident	Resolution
2/5/2013	Virginia Water Systems	3	2531 Oak Lake Blvd	Charcoal canister evacuation	Compliance
4/17/2013	Pella Windows and Doors	3	2211 Station Rd	Waste disposal	Referred to DEQ & Code Compliance, met with property manager
5/7/2013	G&J Transport	3	2101 Pine Forest Dr	Waste management	Cleanup
7/12/2013	Richmond Steel, Inc.	3	14500 Jefferson Davis Hwy	Suspect illicit discharge	No illicit discharge
10/17/2013	Commodore Sales & Coatings	3	11002 Trade Rd	Discharges to impervious surface	Compliance, upcoming referral for VPDES permit
10/18/2013	Honeywell	4	2730 E Hundred Rd	Chemical spill	Compliance
10/22/2013	Hoover and Strong	3	10700 Trade Rd	Hazardous waste management	Compliance, referral for VPDES permit
12/2013	Kaiser Aluminum	4	1901 Reymet Rd	Leaking pipe	Compliance

Virginia Water Systems used potable water to force expired charcoal out of water filtering canisters. Water from a settling bin was allowed to flow over asphalt to a storm drain inlet. Field and lab measurements suggest that the water was not contaminated; however, the company is now using the water for irrigation purposes.

Pella Windows and Doors was improperly disposing of liquid wastes to a dumpster with leaks onto a concrete pad and neighboring ground. This issue was referred to the permits and compliance section of VA DEQ. Other waste management issues were referred to County Code Compliance and DOGS.No water quality violations were observed.

G&J Transport demolished several damaged work trailers and had not properly disposed of the waste products. The company was required to dispose of the waste properly and to cease demolition activities.No water quality impacts were observed, although were possible given the proximity of the company to adjacent water resources and sensitive natural areas.

Richmond Steel was suspected of an illicit discharge to either the sanitary or stormwater system when an apparent hose was observed leading from the manufacturing facility to an outside manhole. Upon inspection it was determined that the hose was a thick electrical cable powering a

sump pump to lift waste from settling chambers into the sanitary line. Underground utilities had failed therefore the industry was using the surface cable.

During the desktop evaluation preparation for outfall screening, Commodore Sales and Coatings was identified as having a potential illicit discharge based on pavement staining readily observed on aerial photography. The company manufactures and distributes vehicle wash chemicals. An onsite investigation determined the company was washing vehicles and chemical drums outside the facility. Additionally, grey water from rag laundering was leaking from improperly maintained washing machines and the resulting effluent was allowed to flow out of the building. They moved the vehicle and drum washing activities indoors and repaired the plumbing for the laundry wash by properly connecting the machines to the sanitary sewer lines. The County will continue to work with this business to ensure their continued compliance with state and local regulations.

A tanker truck transporting the chemical caprolactam from the Honeywell facility in Hopewell, VA to the facility in Chester, VA leaked between five and ten gallons over several miles of roadway due to several faulty valves and caps on the transport truck. Caprolactam is a non-hazardous chemical that rapidly biodegrades in the environment. Representatives from FEMS, EE and Pretreatment responded to the incident. The County officials determined in conjunction with representatives of Honeywell, VA DEQ, VDOT and VADEM, the best course of action for the clean-up response along the length of affected roadway. Each party agreed to allow the product to absorb into the asphalt and degrade in sunlight. In addition to the roadway clean-up, clean-up activities occurred at the Honeywell truck scales at the Chester facility, where a significant quantity of caprolactam had leaked.Honeywell performed sampling during a minor rain event two days later and did not detect caprolactam in the discharge from the drainage system.

In response to a resident complaint, WQ staff conducted an inspection on Hoover and Strong, a company that smelts and refines precious metal scrap to create mill products and jewelry. Industrial wastewater from these processes was stored in intermediate bulk containers in the parking lot. No discharge was observed from the intermediate bulk containers but recommendations were made to reduce the potential for discharges. This company was referred to VA DEQ as research revealed they are required to apply for coverage under the general stormwater permit or to apply for no exposure certification pursuant to their SIC code.

In December 2013, staff from Pretreatment reported the observation of a leaking pipe at the Kaiser Aluminum facility. WQ staff followed-up by contacted the company's Environmental Health and Safety officer. The safety officer explained the pipe conveyed fluid from non-contact cooling water. Said water was being sent directed to the sanitary sewer system and had begun leaking due to deteriorated seals between pipe segments and the onset of seasonal temperature changes.The fluid was leaking onto a grassy surface and infiltrating. The company was aware of the problem and affecting a correction. An industrial inspection by WQ is scheduled for early 2014.

Updates to the Industrial/Commercial Facilities Inspection Program

In 2012, the *Industrial & Commercial Facility Inspection Standard Operating Procedure Manual* was modified in response to comments made by the EPA during the audit process. No changes were made in 2013. This document is available upon request from EE.

§122.26 (d)(2)(iv)(D "A PROGRAM TO IMPLEMENT AND MAINTAIN STRUCTURAL AND NON-STRUCTUAL BEST MANAGEMENT PRACTICES TO REDUCE POLLUTANTS IN STORMWATER RUNOFF FROM CONSTRUCTION SITES"

(1) Procedures for site planning which incorporate consideration of potential water quality impacts

Land Disturbance Permits

EE issued 121 LDPs (612.62 total disturbed acres) to ensure compliance with the minimum standards and practices required in conjunction with the regulations pertaining to Virginia's Erosion and Sediment Control Law (Table 11). BI issued 1,054 permits for the construction of single-family residences (147.743 disturbed acres).

Table 11. Land disturbance and single-family residence permits issued by month during 2013 and the associateddisturbed acres

	LDP	Disturbed Acres	Single Family Residence	Disturbed Acres
January	6	26.45	78	35.4
February	7	36.56	71	8.15
March	11	41.16	96	11.02
April	11	73.78	111	12.74
May	13	69.25	103	11.82
June	9	15.93	97	11.13
July	14	131.09	89	10.22
August	16	66.47	92	10.56
September	7	36.95	79	9.07
October	10	20.43	83	9.53
November	5	50.83	85	9.76
December	12	43.72	70	8.03
Total	121	612.62	1054	147.43

The description of these 121 land disturbance permits and 1,054 single-family residence permits can be found in the monthly ESC reports submitted to VA DEQ. Copies of these reports can be made available upon request.

(2) A description of requirements for nonstructural and structural best management practices.

Best Management Practices

Please refer to §122.26 (d) (2) (iv) (A), *"A Description of Structural and Source Control Measures to Reduce Pollutants from Runoff from Commercial and Residential Areas that are Discharged from the Municipal Storm Sewer System"* for details regarding BMP/SWM facilities in Chesterfield County (page 9 of this report).

(3) A description of procedures for identifying priorities for inspecting sites and enforcing control measures which consider the nature of the construction activity, topography, and the characteristics of the soils and receiving water quality.

Construction Site Inspections - Erosion & Sediment Control

EE staff is responsible for inspections and enforcement of the VADCR required ESC Program. In 2009, in an effort to improve compliance with VADCR ESC Program, EE began working in conjunction with BI. Building inspectors conduct ESC inspections concurrently with their inspections of single-family dwellings. In 2013, 25,820ESC inspections were conducted. There were 18,501ESC inspections conducted for single-family dwellingsand 11,777 inspections for development sites and subdivisions. Resident complaints accounted for an additional 16 inspections in 2013. One hundred seventy (170) of the site and subdivision inspections resulted in the issuance of Notices to Comply. There were four NOVs issued during the 2013 calendar year. The EE ESC program continues to be compliant with the Virginia Water Control Board in 2013.

(4) Educational and training measures for construction site operators.

Educational and Training Measures for Construction Site Operators

As previously reported, applicants for LDP must designate a Responsible Land Disturber who has been trained in erosion and sediment control techniques and who is to oversee compliance with all approved erosion and sediment control measures on that site. As of this writing, several thousand contractors have now received certification through the state training and certification program. Additionally,inspectors from BI have been certified by VA DCR to assist in compliance inspections for single-family residential construction projects. All the ESC inspectors are currently enrolled by VADEQ in the new VSMP certification program and are anticipating certification in 2014.The EE Web page contains education information regarding ESC. The link for this site is:http://www.chesterfield.gov/content2.aspx?id=2836